

## DISTRIBUTION AND CONSERVATION OF FROGS AND REPTILES OF QUEENSLAND RAINFORESTS

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Forty-six species of frogs and 95 species of reptiles are now known from the wet and dry rainforests of Queensland. Close to 70% of frog species and 63% of reptile species are well protected; nearly 20% of frog and reptile species are still either poorly or not protected in reserves.

Conservation programmes for Queensland's rainforest frog and reptile species must address the following problems: unexplained declines in frog populations; survey of moist rainforest on Moa Is.; protection of moist rainforest at Somerset and the McIlwraith Ra., FNEQ, and of dry rainforests; and the paucity of ecological data on most species.

Many new species of frogs and reptiles have been described in the last decade, and the herpetofauna of Queensland's rainforests is now well-known taxonomically. It is important that research on this group not consume an excessive proportion of the research resources, to the detriment of the futures of other taxa and habitats. □ *Australia, rainforest, frogs, reptiles, declining frogs, conservation, Wet Tropics, distribution.*

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A review of patterns of occurrence and conservation of frog and reptile species restricted to tropical and subtropical moist rainforests of eastern Australia has been published recently (Covacevich & McDonald, 1991). That review was based essentially on museum specimens and references available in the early 1980s, and submitted for publication in 1984. The period 1984-1990 was a very active one for research on Queensland's rainforest frogs and reptiles and, while some up-dating was possible while the paper was in press, much that was new could not be included.

This work is both narrower and broader than the previous study. Here, we confine ourselves to Queensland rainforests, because most of what is new regarding rainforest frog and reptile species has been discovered in Queensland. However, in addition to obligate rainforest species we include all species recorded in rainforests. Further, we have adopted a broader definition of rainforest, including both 'wet rainforests' (vine forests and fern forests of all types) and 'dry rainforests' (= deciduous and semi-deciduous vine thickets).

As well as incorporating data on facultative rainforest species (along with the obligate rainforest species), this review includes data of Greer et al., 1983 (*Lerista vittata*); Greer, 1985 (*Sphenomorphus cracens*); Wells & Wellington, 1985 (many spp., including *Cacophis churchilli* and

*Saltuarius swaini*); Greer & Cogger, 1985 (*Anomalopus* and *Ophioscincus* spp.); Zweifel, 1985 (microhylid frogs); Davies et al., 1986 (*Litoria xanthonera*); Corben & Ingram, 1987 (*Mixophyes fleayi*); Ingram & Covacevich, 1988 (*Lygisaurus* spp.); Ingram & Covacevich, 1989 (*Carlia* spp.); Ingram, 1991 (*Lampropholis* spp.); Sprackland, 1991 (*Varanus teriae*); McDonald, 1992 (conservation of northern rainforest frogs); Greer, 1992 (*Eulamprus tenuis* group); Couper et al., 1993 (*Saltuarius* spp. and *Phyllurus* spp.); Covacevich et al., 1993 (*Nangura spinosa*); and Sadlier et al., 1993 (*Saproscincus challengerii* species complex); Richards et al., 1993 (*Litoria eucnemis*, *L. genimaculata*). Since the 1980s the results of frog/reptile surveys in previously unknown or poorly known rainforests have been published (e.g. Horsup et al., 1993; Covacevich et al., 1993). These are incorporated, along with additional records compiled incidentally by one of us (KMCD).

New data has been combined with that known previously into a list of frog and reptile species recorded from Queensland's rainforests sensu lato (Table 1). For each species are provided: ranges in both latitude and altitude; notes on habitat; conservation status; and level of habitat protection.

## DISTRIBUTION

In assessing the species for inclusion in Table 1, three categories of reptiles and frogs occurred only occasionally in rainforest and are not considered further: open vegetation species which were using patches of rainforest or gallery forest as dry season refugia (e.g. *Bufo marinus*, *Limnodynastes ornatus*, *Litoria bicolor*, *L. gracilentata*, *L. nigrofrenata*, *L. rothii*, *Sphenophryne gracilipes*, *Glaphyromorphus pumilus*, *Lygisaurus macfarlani*, *L. sesbrauna*); species occurring on rainforest margins or utilising natural openings such as rock faces and scree slopes (e.g. *Heteronotia binoei*, *Oedura rhombifer*, *Dendrelaphis calligastra*, *D. punctulatus*, *Tropidonophis mairii*, *Demansia torquata*, *Morelia*

*maculosa*); species entering rainforest which has been disturbed by roads, logging, mining or real estate (e.g. *Bufo marinus*, *Litoria nasuta*, *Limnodynastes peronii*, *Litoria nigrofrenata*, *Lialis burtonis*, *Heteronotia binoei*, *Oedura rhombifer*, *Carlia longipes*, *C. rostralis*, *C. pectoralis*, *Tropidonophis mairii*, *Morelia maculosa*, *Demansia psammophis*, *D. torquata*).

Conservation status was determined using the definitions of Thomas and McDonald, 1989. Level of habitat protection is defined: well protected (recorded from several conservation reserves, or all or most of the population in reserves); moderately protected (found in more than two reserves); poorly protected (only recorded from one or two reserves); unprotected (not on any reserves).

Table 1. Frog and reptile species recorded from Queensland's wet and dry rainforests, based largely on records of the Queensland Museum, the literature and observations by KMCD.

## FROGS

## Myobatrachidae

- Adelotus brevis* (Gunther 1863): Eungella NP, MEQ; Byfield, MEQ - Grove Ck, NSW; 21° 00'S, 148° 35'E - 21° 11', 148° 35'; 22° 50', 150° 41' - 33° 50', 148° 23'; sea level - 1000+m; subtropical vine forest, also heaths, moist forests and moist sandstone gorges of sub-coastal upland areas; secure; well protected.
- Assa darlingtoni* (Loveridge 1933): Conondale Ra., SEQ - Gibraltar Ra., NENSW; 26° 37'S, 152° 35'E - 29° 36', 152° 13'; usually above 1000m, infrequently to 300m; subtropical vine forest; rare; moderately protected.
- Kyarranus kundagungan* Ingram & Corben, 1975: Mistake Mtns - Mt Superbus, SEQ; 27° 55'S, 152° 20'E - 28° 12', 152° 29'; 300 - 1000m; subtropical vine forest; rare; well protected.
- Kyarranus loveridgei* (Parker, 1940): McPherson Ra., SEQ - Mt Warning, NENSW; 28° 15'S, 153° 15'E - 28° 24', 153° 16'; above 750m; subtropical vine forest; rare; well protected.
- Lechriodus fletcheri* (Boulenger, 1890): Cunningham's Gap, SEQ - near Gosford, NSW; 27° 58'S, 152° 25'E - 33° 25', 151° 20'; above 750m; subtropical vine forest; secure; well protected.
- Mixophyes fasciolatus* Günther, 1864: Eungella NP, MEQ; 20° 50'S, 148° 28'E - 21° 11', 148° 32'; Kroombit Tops, MEQ - Gosford, NSW; 24° 24', 151° 00' - 33° 25', 151° 17'; sea level - 1100m; subtropical vine forest, adjacent moist open forests; secure; well protected.
- Mixophyes fleayi* Corben and Ingram, 1987: Conondale Ra., SEQ - Tooloom Scrub, NSW; 26° 30'S, 152° 37'E - 28° 40', 152° 30'; 620m+; subtropical vine forest; insufficiently known; poorly protected.
- Mixophyes iteratus* Straughan, 1968: Conondale Ra., SEQ - Narooma, NSW; 26° 37'S, 152° 35'E - 36° 13', 150° 09'; 100 - 1000m; subtropical vine forest; insufficiently known; poorly protected.
- Mixophyes schevilli* Loveridge, 1933: Big Tblnd - Mt Halifax, NEQ; 15° 42'S, 145° 16'E - 19° 07', 146° 22'; sea level - 1500m; monsoon vine forest; secure; well protected.
- Rheobatrachus silus* Liem, 1973: Blackall and Conondale Ra., SEQ, Booloumba Ck - Kileoy Ck, SEQ; 26° 37'S, 152° 35' - 26° 47', 152° 38'; 400 - 800m; subtropical vine forest; endangered, ? extinct; poorly protected.
- Rheobatrachus vitellinus* Mahony, Tyler & Davies, 1984: Eungella NP, Clarke Ra., MEQ; 20° 50'S, 148° 33'E - 21° 07', 148° 33'; 400 - 1000m; subtropical vine forest; endangered, ? extinct; well protected.
- Taudactylus acutirostris* (Andersson, 1916): Big Tblnd - Mt Graham, NEQ; 15° 42'S, 145° 16'E - 18° 24', 145° 52'; 300 - 1500m; monsoon vine forest; endangered; well protected.
- Taudactylus diurnus* Straughan & Lee, 1966: Blackall and Conondale Ras, Mt Glorious, SEQ; 26° 37'S, 152° 35'E - 27° 23', 152° 47'; 400 - 800m; subtropical vine forest; endangered, ? extinct; poorly protected.
- Taudactylus eungellensis* Liem & Hosmer, 1973: Cathu SF - Eungella NP, Clarke Ra., MEQ; 20° 50'S, 148° 33'E - 21° 07', 148° 33'; 200 - 1000m; subtropical vine forest; endangered; well protected.
- Taudactylus liemi* Ingram, 1980: Cathu SF, Clarke Ra. - Crediton SF, MEQ; 20° 51'S, 148° 34'E - 21° 11', 148° 35'; 250 - 1000m; subtropical vine forest; rare; well protected.
- Taudactylus pleione* Czechura, 1986: Kroombit Tops SF, SEQ; 24° 24'S, 150° 59'E; 900m; subtropical vine forest; insufficiently known; poorly protected.
- Taudactylus rheophilus* Liem & Hosmer, 1973: four allopatric populations on Thornton Pk, Carbine Tblnd, Lamb



Ra., Bellenden Ker Ra., NEQ; 16° 10'S, 145° 22'E - 17° 16', 145° 22'; 900m - 1500m; monsoon vine forest; endangered; well protected.

#### Ranidae

*Rana daemeli* (Steindachner, 1868): Cape York tip - Rollingstone, NEQ; extralimital in PNG; 10° 42'S, 142° 32'E - 19° 03', 146° 23'; sea level - 640m, mostly < 100m; monsoon vine forest, usually from open forests, entering rainforest along roads & clearings, Cape York populations from riparian rainforest; secure; well protected.

#### Hylidae

*Litoria caerulea* (White, 1790): throughout Q, extralimital in WA, NT, SA, NSW; sea level - 800m. Predominantly associated with open vegetation, entering disturbed rainforest & dry vine thickets; secure; well protected.

*Litoria chloris* (Boulenger, 1893): Conway Ra. NP - Eungella NP, MEQ; Bulburin SF, MEQ - Gosford, NSW; 20° 24', 148° 35' - 21° 08', 148° 30'; 24° 15', 151° 24' - 33° 26', 151° 20'; sea level - 1000m; subtropical vine forest; secure; well protected.

*Litoria eucremis* (Lönnberg, 1900): Ducie R. - Wenlock R.; Iron Ra. - McIlwraith Ra., FNEQ; 12° 07'S, 142° 21'E - 12° 16', 141° 59'; 12° 46', 143° 16' - 13° 50', 143° 17'; sea level - 20m; monsoon vine forest; secure; poorly protected.

*Litoria genimaculata* (Horst, 1883): Big Tblnd - Paluma, NEQ; 15° 42'S, 145° 16'E - 19° 01', 146° 12'; sea level - 1300m; monsoon vine forest; secure; well protected.

*Litoria infraenata* (Gunther, 1867): Cape York tip, FNEQ - Mutarnee, NEQ; Extralimital in PNG; 10° 42', 142° 32' - 19° 00', 146° 20'; sea level - 580m; monsoon vine forest, usually from open forests enters riparian rainforest & rainforest edges; secure; well protected.

*Litoria lesueurii* (Duméril & Bibron, 1841): Cooktown, NEQ - Victoria; 15° 25'S, 145° 05'E-V; sea level - 1200m; monsoon, dry, subtropical vine forests & moist open forests; secure; well protected.

*Litoria longirostris* Tyler & Davies 1978: Leo Ck - Station Ck, FNEQ; 13° 42'S, 143° 18'E - 13° 57', 143° 19'; 400 - 820m; monsoon vine forest; rare; not protected.

*Litoria lorica* Davies & McDonald, 1979: Alexandra Ck - Hilda Ck, Thornton Pk NEQ; 16° 07', 145° 20' - 16° 10', 145° 23'; 640 - 1000m; monsoon vine forests; vulnerable; well protected.

*Litoria nannotis* (Andersson, 1916): Big Tblnd-Mt. Halifax, NEQ; 15° 42'S, 145° 16'E - 19° 11'S 146° 27'E; 80-1300m; monsoon vine forest; vulnerable; well protected.

*Litoria nyakalensis* (Liem, 1974): McDowall Ra. - Douglas Ck, Kirrama Ra., NEQ; 16° 07'S, 148° 20'E - 18° 13', 145° 48'; 380 - 1020m; monsoon vine forest; endangered; well protected.

*Litoria pearsoniana* (Copland, 1961): Kroombit Tops, SEQ - Lismore, NSW; 24° 24'S, 151° 01'E - 28° 50', 153° 01'; 200 - 1000m; subtropical vine forest, sometimes along perennial, densely vegetated streams in open forest adjacent to rainforest; insufficiently known; well protected.

*Litoria revelata* Ingram, Corben & Hosmer, 1982: three allopatric populations; Atherton Tblnd, NEQ; Clark Ra., MEQ; Mt Tamborine, SEQ - Smith's Lake, NSW; 17° 23'S, 145° 42'E - 17° 36', 145° 29'; 21° 01', 148° 36' - 21° 07', 148° 31'; 27° 55', 153° 10' - 32° 23', 152° 29'; 400 - 900m; monsoon and subtropical vine forests, open forests, and pastures; secure; moderately protected.

*Litoria rheocola* (Liem, 1974): Amos Bay - Broadwater Ck, NEQ; 15° 41'S, 145° 19'E - 18° 23', 145° 57'; sea level - 1180m; monsoon vine forest; vulnerable; well protected.

*Litoria xanthomera* Davies, McDonald & Adams, 1986: Big Tblnd -Bluewater Ra., NEQ; 15° 42'S, 145° 17'E - 19° 07', 146° 23'; 20 - 1300m; monsoon vine forest; secure; well protected.

*Nyctimystes dayi* (Gunther, 1897): Big Tblnd - Paluma, NEQ; 15° 42'S, 145° 16'E - 19° 01', 146° 13'; sea level - 1200m; monsoon vine forest, along densely vegetated perennial streams adjacent to rainforest; vulnerable, well protected.

#### Microhylidae

*Cophixalus bombiens* Zweifel, 1986: Shipton's Flat - Mt Lewis, NEQ; 15° 47'S, 145° 14'E - 16° 35', 145° 16'; 200 - 1300m; monsoon vine forest; rare; well protected.

*Cophixalus concinnus* Tyler, 1979: Mt Finnigan - Mt Lewis, NEQ; 15° 49'S, 145° 17'E - 16° 35', 145° 16'; 560 - 1300m; monsoon vine forest; rare; well protected.

*Cophixalus crepitans* Zweifel, 1985: McIlwraith Ra., FNEQ; 13° 44'S, 143° 20'E; 380 - 540m; rare; unprotected.

*Cophixalus exiguus* Zweifel & Parker, 1969: Big Tblnd - Mt Finnigan, NEQ; 15° 42'S, 145° 16'E - 15° 49', 145° 16'; 180 - 1120m; monsoon vine forest; rare; moderately protected.

*Cophixalus hosmeri* Zweifel, 1985: Mt Spurgeon - Mt Lewis, NEQ; 16° 27'S, 145° 12'E - 16° 35', 145° 16'; 960 - 1370m; monsoon vine forest; rare; moderately protected.

*Cophixalus infacetus* Zweifel, 1985: Crystal Cascades - Dalrymple Gap, NEQ; 16° 58'S, 145° 40'E - 18° 24', 146° 05'; 40 - 800m; monsoon vine forest; secure; well protected.

*Cophixalus mcdonaldi* Zweifel, 1985: Mt Elliot, Bowling Green Bay NP, NEQ; 19° 30'S, 146° 58'E; 900+ m; monsoon vine forest; rare; well protected.

*Cophixalus neglectus* Zweifel, 1962: Mt Bellenden Ker and Mt Bartle Frere, NEQ; 17° 16'S, 145° 49'E - 17° 24', 145° 51'; 900 - 1600m; monsoon vine forest; rare; well protected.

- Cophixalus ornatus* (Fry, 1912): Mt Spurgeon - Bluewater Ra., NEQ; 16° 27'S, 145° 23'E - 19° 12', 146° 22'; sea level - 1520m; monsoon vine forest; secure; well protected.
- Cophixalus peninsularis* Zweifel, 1985: Leo Ck, McIlwraith Ra., FNEQ; 13° 44'S, 143° 20'E; 520-540m; monsoon vine forest; insufficiently known; unprotected.
- Sphenophyrne fryi* Zweifel, 1962: Big Tblnd - Lamb Ra. NEQ; 15° 42'S, 145° 16'E - 17° 08', 145° 36'; sea level - 1300m; monsoon vine forest; secure; well protected.
- Sphenophyrne pluvialis* Zweifel, 1965: Gap Ck, Cedar Bay NP - Mt Fox SF, NEQ; 15° 49'S, 145° 19'E - 18° 35', 145° 49'; sea level - 1300m; monsoon vine forest; secure; well protected.
- Sphenophyrne robusta* (Fry, 1912): Lamb Ra. - Bluewater Ra., NEQ; 17° 06'S, 145° 36'E - 19° 12', 146° 23'; 360 - 1520m; monsoon vine forest; secure; well protected.

**REPTILES****Gekkonidae**

- Carphodactylus laevis* (Günther, 1897): Big Tblnd - Douglas Ck, Kirrama, NEQ; 15° 42'S, 146° 16'E - 18° 12', 145° 47'; 300 - 1400m; monsoon vine forest; secure; well protected.
- Cyrtodactylus louisianensis* (de Vis, 1892): two disjunct populations: McIlwraith Ra., FNEQ; Cape Flattery, NEQ - Chillagoe, NEQ; extralimital in PNG; 12° 30'S, 143° 16'E; 15° 01', 145° 13' - 17° 16', 144° 37'; sea level - 600m; monsoon vine forest, also occurs in moist open forests on Cape York; secure; moderately protected.
- Phyllurus caudiannulatus* Covacevich, 1975: Bulburin SF; 24° 31' 151° 30'; 200 - 600m; subtropical vine forest; rare; unprotected.
- Phyllurus isis* Couper, Covacevich & Moritz, 1993: Mt Blackwood - Mt Jukes, MEQ; 21° 02'S, 148° 56'E - 21° 02', 148° 57'; 250 - 500m; monsoon vine forest; rare, well protected.
- Phyllurus nephys* Couper, Covacevich & Moritz, 1993: Clark Ra., MEQ; 21° 01'S, 148° 36'E - 21° 19', 148° 34'; 250 - 1000+ m; subtropical vine forest; rare; well protected.
- Phyllurus ossa* Couper, Covacevich & Moritz, 1993: Mt Dryander, Conway NP - Mt Charlton, MEQ; 20° 15'S, 148° 33'E - 21° 01', 148° 44'; 200 - 400m; monsoon vine forest; rare; well protected.
- Saltuarius cornutus* (Ogilby, 1892): Big Tblnd - Paluma, NEQ; 15° 42'S, 146° 16'E - 19° 01', 146° 14'; 100 - 1100m, mostly above 600m; monsoon vine forest; secure; well protected.
- Saltuarius occultus* Couper, Covacevich & Moritz, 1993: Peach Ck, McIlwraith Ra., FNEQ; 13° 45', 143° 19' - 13° 46', 143° 19'; 500 - 800m; monsoon vine forest; insufficiently known; unprotected.
- Saltuarius salebrosus* (Covacevich, 1975): Blackdown Tblnd, MEQ - Cracow, SEQ; 23° 46'S, 149° 06'E - 25° 18', 150° 18'; sea level - 1000m; dry vine thickets, often associated with sandstone uplands & gorges, open forest; secure; moderately protected.
- Saltuarius swaini* (Wells & Wellington, 1984): Mt Tambourine, SEQ - Girvan, NSW; 27° 55'S, 153° 10'E - 32° 28', 152° 04'; 750m - 1000m; subtropical vine forest; secure; well protected.
- Rhacodactylus australis* (Günther, 1877): Horn, Prince of Wales and Wednesday Is, Torres Strait; McDonnell-Cockatoo Ck, Heathlands - Lankelly Ck, FNEQ; 10° 37'S 142° 17'E, 10° 41'S 142° 09'E, 10° 32'S 142° 19'E; 11° 35'S, 142° 22'E - 13° 52', 143° 15'; sea level - 550m; monsoon vine forests, open forest & woodland; secure; moderately protected.

**Scincidae**

- Anomalopus brevicollis* Greer & Cogger, 1985: Finch Hatton Gorge, Eungella NP - Cracow, MEQ; 21° 04'S, 148° 38'E - 25° 18'; 150° 18'; 250 - 1000m; dry vine thicket, predominantly associated with open vegetation; secure; moderately protected.
- Anomalopus gowi* Greer & Cogger, 1985: Mt. Mulligan - Woodstock, NEQ; 16° 52'S, 145° 52'E - 19° 35', 146° 54'; 60 - 800m; dry vine thicket, also open forest and woodlands; insufficiently known; poorly protected.
- Anomalopus pluto* Ingram, 1977: vicinity of Heathlands, FNEQ; 11° 33'S, 142° 26'S - 11° 45'S, 142° 41'; sea level - 100m; monsoon vine forest, also in adjacent heaths, woodlands; rare; unprotected.
- Anomalopus verreauxii* Duméril & Duméril, 1851: Proserpine, MEQ - Red Rock, NSW; 20° 24'S, 148° 35'E - 29° 59', 153° 12'; sea level - 900m; dry vine thickets, predominantly from open vegetation; secure; well protected.
- Bartleia jigurru* (Covacevich, 1984): Mt Bartle Frere, NEQ; 17° 23'S, 145° 48'E; 1500m+; monsoon vine forest; rare; well protected.
- Calyptotis lepidorostrum* Greer, 1983: Eungella, MEQ - Conondale Ra., SEQ; 21° 09'S, 148° 29'E - 26° 45', 152° 50'; 200 - 920m; subtropical vine forest; secure; moderately protected.
- Calyptotis scutirostrum* (Peters, 1873): Gympie, SEQ - Dorrigo, NSW; 26° 11'S, 152° 40'E - 30° 20', 152° 43'; 20 - 750m; subtropical vine forest, coastal heathlands and moist sclerophyll forests; secure; moderately protected.
- Calyptotis temporalis* Greer, 1983: Finch Hatton Gorge, Eungella NP, MEQ - Byfield, SEQ; 21° 05'S, 148° 35'E - 23° 05', 150° 40'; 20 - 685m; subtropical vine forests; secure; moderately protected.
- Calyptotis thornstonensis* Greer, 1983: Thornton Pk, NEQ; 16° 11'S, 145° 24'E; 640m; monsoon vine forests; insufficiently known; well protected.



- Carlia coensis* (Mitchell, 1953): Birthday Mt - 13km SW Coen, FNEQ; 13° 33'S, 143° 09'E - 14° 01', 143° 06'; 220 - 550m; monsoon vine forest, woodland, usually on rocks; rare; unprotected.
- Carlia longipes* (Macleay, 1877): Darnley Is - Gordonvale, NEQ, extralimital NT & PNG; 9° 35'S, 143° 46'E - 17° 06', 145° 48'; sea level - 600m; monsoon vine forest; secure; moderately protected.
- Carlia mundivensis* (Broom, 1898): Chillagoe, NEQ - Chinchilla, SEQ; 17° 09'S, 144° 31'E - 26° 45', 150° 38'; 100 - 800m; dry vine thicket, invariably with rocks, predominantly from open forest; secure; poorly protected.
- Carlia rhomboidalis* (Peters, 1869): Magnetic Is., NEQ - East Funnel Ck, MEQ; 19° 08'S, 146° 50'E - 21° 36', 149° 12'; 0 - 1000m; secure; well protected.
- Carlia rubrigularis* Ingram & Covacevich, 1989: Big Tblnd - Bluewater Ra., NEQ; 15° 42'S, 145° 16'E - 19° 07', 146° 22'; sea level - 1200m; secure; well protected.
- Cautula zia* (Ingram & Ehmann, 1981): Cunningham Gap, SEQ - Styx R. SF, NSW; 27° 58'S, 152° 25'E - 30° 36', 152° 19'; 560 - 1300m; subtropical vine forests; secure; moderately protected.
- Coeranoscincus frontalis* (de Vis, 1888): Mt Sorrow - Mt Elliot, NEQ; 16° 05'S, 145° 26'E - 19° 29', 146° 58'; 20 - 1000m; monsoon vine forests; secure; well protected.
- Coeranoscincus reticulatus* (Günther, 1873): Cooloola, SEQ - Richmond Ra., NSW; 25° 58'S, 153° 06'E - 29° 41', 152° 56'; 20 - 1000m; subtropical vine forest; vulnerable; well protected.
- Cyclodomorphus gerrardi* (Gray, 1845): Whitfield Ra., NEQ - Blue Mtns, NSW; 16° 56'S, 145° 42'E - 33° 36', 150° 15'; 20 - 700m; subtropical & monsoon vine forests, moist and dry sclerophyll forests; secure; well protected.
- Egernia frerei* Günther, 1897: Murray Is., Torres Strait, FNEQ - Coffs Harbour, NSW; 9° 56'S, 144° 02'E - 30° 17', 153° 08'; sea level - 1000m; subtropical & monsoon vine forests; secure; well protected.
- Egernia major* (Gray, 1845): Gympie, SEQ - Gosford, NSW; 26° 11'S, 152° 40'E - 33° 26', 151° 20'; sea level - 1000m subtropical vine forest; secure; well protected.
- Egernia striolata* (Peters, 1870): Forty Mile Scrub NP, NEQ - SA; 18° 08'S, 144° 43'E - SA; 20 - 800m; subcoastal vine thickets, predominantly from open forests; secure; moderately protected.
- Emoia longicauda* (Macleay, 1877): Darnley Is., Torres Strait - McIlwraith Ra., FNEQ; extralimital in PNG; 9° 35'S, 143° 46'E - 13° 33', 143° 28'; sea level - 250m; monsoon vine forest; secure; poorly protected.
- Erotoscincus graciloides* (Lönnerberg & Andersson, 1913): Fraser Is. - Pine Mtn, near Ipswich, SEQ; 24° 48'S, 153° 13'E - 27° 32', 152° 43'; sea level - 600m; subtropical vine forests, wet sclerophyll forests; rare; poorly protected.
- Eugongylus rufescens* (Shaw 1802): Darnley Is., Torres Strait - Lockerbie, FNEQ; extralimital in PNG; 9° 35'S, 143° 46'E - 10° 47', 142° 30'; sea level - 50m; monsoon vine forest; secure; poorly protected.
- Eulamprus amplus* (Covacevich & McDonald, 1980): Brandy Ck, Conway Ra. - Eungella NP, MEQ; 20° 55'S, 148° 44'E - 21° 06', 148° 29'; 150 - 1100m; subtropical & monsoon vine forest; rare; well protected.
- Eulamprus brachysoma* (Lönnerberg & Andersson, 1915): Coen, NEQ - Lever's Plateau, nr Lamington NP, SEQ; 13° 56'S, 143° 12'E - 28° 20', 152° 52'; sea level - 1100m; monsoon & subtropical vine forest; secure; well protected.
- Eulamprus frerei* Greer, 1992: Mt Bartle Frere, NEQ; 17° 24'S, 145° 48'E; 1600m; monsoon vine forest; insufficiently known; well protected.
- Eulamprus luteilateralis* (Covacevich & McDonald, 1980): Mt William & Mt Dalrymple area, Eungella NP, MEQ; 21° 08'S, 148° 30'E; above 900m; subtropical vine forests; rare; well protected.
- Eulamprus martini* Wells & Wellington, 1985: Homevale, MEQ - Coffs Harbour, NSW; 21° 23'S, 148° 32'E - 30° 20', 153° 07'; sea level - 1000m; dry vine thickets, usually from open forests; secure; well protected.
- Eulamprus murrayi* (Boulenger, 1887): Conondalc Ra., SEQ - Barrington Tops, NSW; 26° 37'S, 152° 35'E - 32° 02', 151° 24'; 300 - 1000+m; subtropical vine forest; rare; moderately protected.
- Eulamprus quoyii* (Dumeril & Bibron, 1839): Daintree, NEQ - Budawang, NSW; 16° 15'S, 145° 19'E - 30° 18', 153° 08'; sea level - 1000m; subtropical & monsoon vine forest; secure; well protected.
- Eulamprus sokosoma* Greer, 1992: Taravale, NEQ - Injune, MEQ; 19° 07'S, 146° 04'E - 25° 51', 148° 34'; 20 - 800m; dry vine thickets; rare; poorly protected.
- Eulamprus tenuis* (Gray, 1831): Holbourne Is., MEQ - Bega, NSW; 19° 43'S, 148° 22'E - 36° 40', 149° 55'; sea level - 750m; dry vine thickets, subtropical vine forest; secure; well protected.
- Eulamprus tigrinus* (De Vis 1888): Shipton's Flat - Smoko Ck, NEQ; 15° 48'S, 145° 14'E - 18° 09', 145° 37'; sea level - 1600m; monsoon vine forest; secure; well protected.
- Glaphyromorphus cracens* (Greer, 1985): Mt Mulligan - Wyandotte Ck, NEQ; 16° 50'S, 144° 51'E - 18° 35', 144° 33'; 400 - 1000m; dry vine thickets, predominantly from open forests; secure; poorly protected.
- Glaphyromorphus fuscicaudis* (Greer, 1979): Big Tblnd - Bluewater Ra., NEQ; 15° 42'S, 145° 16'E - 19° 15', 146° 29'; 40 - 1160m; monsoon vine forest; secure; well protected.
- Glaphyromorphus mjobergi* (Lönnerberg & Andersson, 1915): Mount Carbine Tblnd - Vine Ck, NEQ; 16° 34'S, 145° 15'E - 17° 36', 145° 29'; above 650m; monsoon vine forest; rare; well protected.
- Glaphyromorphus punctulatus* (Peters, 1871): Kaban, NEQ - Mt Walsh NP, SEQ; 17° 31'S, 145° 25'E - 25° 35', 152° 03'; sea level - 1000m; dry vine thicket, predominantly from open forests; secure; well protected.

- Gnypetoscincus queenslandiae* (De Vis, 1890): Big Tblnd - Mt Thorn, NEQ; 15° 42'S, 145° 16'E - 18° 16', 145° 48'; 40 - 1200m; monsoon vine forest; secure; well protected.
- Lampropholis adonis* Ingram, 1991: Conway NP, MEQ - Maleny, SEQ; 20° 15'S, 148° 32'E - 26° 47', 152° 49'; 20 - 980m; monsoon & subtropical vine forest; secure; moderately protected.
- Lampropholis amricula* Ingram & Rawlinson, 1981: Kroombit Tops, SEQ - Karuah SF, NSW; 24° 22'S, 150° 59'E - 32° 36', 151° 56'; 20 - 900m; subtropical vine forest; secure; moderately protected.
- Lampropholis coggeri* Ingram, 1991: Big Tblnd - Mt Elliot, NEQ; 15° 42'S, 145° 16'E - 19° 29', 146° 58', sea level - 1500m; monsoon vine forest; secure; well protected.
- Lampropholis colossus* Ingram, 1991: Bunya Mtns, SEQ; 26° 53'S, 151° 37'E; 1000 - 1200m; subtropical vine forest; rare; well protected.
- Lampropholis couperi* Ingram, 1991: Byfield, MEQ - Mt Glorious, SEQ; 22° 50'S, 150° 41'E - 27° 25', 152° 50'; 40 - 700m; subtropical vine forest; insufficiently known; poorly protected.
- Lampropholis mirabilis* Ingram & Rawlinson, 1981: Magnetic Is. - Mt Elliot, NEQ; 19° 08'S, 146° 50'E - 19° 29', 146° 58'; sea level - 1234m; monsoon vine forest & dry vine thicket; rare; well protected.
- Lampropholis robertsi* Ingram, 1991: Thornton Pk - Mt Bartle Frere, NEQ; 16° 10'S, 145° 23'E - 17° 23', 145° 48'; 600 - 1520m; monsoon vine forest; secure; well protected.
- Lerista colliveri* Couper & Ingram, 1992: Battery Stn - Hughenden, NEQ; 19° 26'S, 145° 52'E - 20° 51', 144° 12'; 300 - 400m; dry vine thickets, predominantly from open forests; secure; poorly protected.
- Lerista vittata* Greer, McDonald & Lawrie, 1983: Mt Cooper Stn, NEQ; 20° 31'S, 146° 55'E; 250 - 300m; dry vine thickets; vulnerable; unprotected.
- Lygisaurus laevis* Ingram & Covacevich, 1988: Amos Bay - Bramston Beach, NEQ; 15° 41'S, 145° 19'E - 17° 21', 146° 01'; sea level - 950m; monsoon vine forest; secure; moderately protected.
- Lygisaurus tanneri* Ingram & Covacevich, 1988: McIvor R., Starcke Stn - Endeavour R., NEQ; 15° 03'S, 145° 08'E - 15° 27', 145° 08'; sea level - 100m; monsoon vine forest; insufficiently known; unprotected.
- Nangura spinosa* Covacevich, Couper & James, 1993: Nangur SF, SEQ; 26° 07'S, 151° 58'E; 300m approx.; semievergreen vine thicket; rare; moderately protected.
- Ophioscincus cooloolensis* Greer & Cogger, 1985: Aldoga, nr Gladstone - Cooloola, SEQ; 23° 48'S, 151° 04'E - 25° 58', 153° 07'; sea level - 900m; subtropical vine forest; rare; moderately protected.
- Ophioscincus ophioscincus* (Boulenger, 1887): Bulburin SF - Brisbane, SEQ; 24° 31'S, 151° 33'E - 27° 28', 153° 0'; sea level - 500m; subtropical vine forest, heathlands; rare; moderately protected.
- Ophioscincus truncatus* (Peters, 1876): Coolool, SEQ - Way Way SF, NSW; 26° 33'S, 153° 05'E - 30° 47', 152° 56'; sea level - 800m; subtropical vine forest, adjacent open forests; rare; moderately protected.
- Saiphos equalis* (Gray, 1825): Kroombit Tops, SEQ - Wollongong, NSW; 24° 20'S, 151° 01'E - 34° 35', 150° 52'; sea level - 1100m; subtropical vine forest, coastal heathland and moist sclerophyll forests; secure; moderately protected.
- Saproscincus challengerii* (Boulenger, 1887): McPherson Ra., area, SEQ & NENSW; 28° 03'S, 152° 24'E - 28° 24', 153° 04'; sea level - 500m; rainforest, moist coastal lowland forest; secure; well protected.
- Saproscincus czechurai* Ingram & Rawlinson, 1981: Big Tblnd - Walter Hill Ra., NEQ; 15° 42' - 17° 47', 145° 49'; 500 - 1000m; monsoon vine forest; secure; well protected.
- Saproscincus galli* Wells & Wellington, 1985: Mt Tamborine, SEQ - Sydney area, MENSW; 27° 58'S, 153° 11'E, 33° 53', 151° 13'; sea level - 1000m; rainforest, low closed remnant forest; secure; well protected.
- Saproscincus rosei* Wells & Wellington, 1985: Gympie, SEQ - Barrington Tops, MENSW; 26° 11', 152° 40'E - 32° 10', 151° 26'; sea level - 1000m; rainforest, moist riverine forest; secure; well protected.
- Saproscincus spectabilis* (de Vis, 1888): Mt Webb - Mt Elliot, NEQ and Mt Dryander - East Funnel Ck, MEQ; 15° 04'S, 145° 08'E - 19° 29', 146° 58'; 20° 15', 148° 38' - 21° 36', 149° 12'; sea level - 1000m; monsoon & subtropical vine forest; secure; well protected.
- Saproscincus tetradactyla* Kluge & Greer, 1979: Mossman Gorge, Daintree NP - Paluma, NEQ; 16° 28'S, 145° 16'E - 19° 00', 146° 12'; 50 - 1000m; monsoon vine forest; secure; well protected.
- Agamidae**
- Hypsilurus boydii* (Macleay, 1884): Big Tblnd - Paluma, NEQ; 15° 42'S, 145° 17'E - 19° 01', 146° 14'; 20 - 1160m; monsoon vine forests; secure; well protected.
- Hypsilurus spinipes* (Duméril & Duméril, 1851): Gallangowan, SEQ - Ourimbah, NSW; 26° 26'S, 152° 17'E - 33° 32', 151° 22'; 50 - 680m; subtropical vine forests; secure; well protected.
- Physignathus lesueurii* (Gray, 1831): Big Tblnd - Victoria; 15° 42'S, 145° 16'E - V; sea level - 700m; subtropical & monsoon vine forest; secure; well protected.
- Varanidae**
- Varanus prasinus* (Schlegel, 1839): Moa Is., Torres Strait; 10° 11'S, 142° 16'E; 180m; 'closed mesic forest'; rare; unprotected. (Whittier & Moeller, 1993).
- Varanus scalaris* Mertens, 1941: Heathlands, FNEQ - Paluma, NEQ; 11° 50'S, 142° 39'E - 19° 01', 146° 13'; sea level - 900m; monsoon vine forests, open forests; secure; well protected.



*Varanus teriae* Sprackland, 1991: Buthen Buthen - Lankelly Ck, FNEQ; 13° 21'S, 143° 27'E - 13° 53', 143° 17'; 100 - 500m; monsoon vine forest; rare; unprotected.

*Varanus varius* (White & Shaw, 1790): Shipton's Flat, NEQ - Victoria; 15° 48'S, 145° 14'E - V; sea level - 700m; subtropical & monsoon vine forests, usually from open forests; secure; well protected.

#### Colubridae

*Boiga irregularis* (Merrem, 1802): Badu Island, Torres Strait - NSW; 10° 07'S, 142° 07'E - NSW; sea level - 1100m; dry vine thickets; monsoon & subtropical vine forests, also in open forests; secure; well protected.

*Stegonotus cucullatus* (Duméril, Bibron & Duméril, 1854): Badu Is, Torres Strait, FNEQ - Rollingstone, NEQ; extralimital in PNG; 10° 42'S, 142° 32'E - 19° 03', 146° 23'; sea level - 250m; monsoon vine forests; secure; well protected.

#### Elapidae

*Cacophis churchilli* Wells & Wellington, 1985; Thornton Pk - Palm Is.; 16° 10'S, 145° 23'E - 18° 40', 146° 33'; sea level - 1000m; monsoon vine forest; secure; well protected.

*Cacophis krefftii* Gunther, 1863: Broken R. - Crediton, MEQ; Cooran Plateau, SEQ - Gosford, NSW; 21° 10'S, 148° 31'E - 21° 13', 148° 30'; 26° 20', 152° 50' - 32° 26', 151° 21'; sea level - 720m; subtropical vine forests, moist & dry sclerophyll forests; secure; well protected.

*Cacophis squamulosus* (Duméril, Bibron & Duméril, 1854): Mt William, Eungella NP, MEQ - Wollongong, NSW; 21° 02'S, 148° 32'E - 34° 26', 150° 53'; sea level - 1000m; subtropical vine forests; secure; well protected.

*Hemiaspis signata* (Jan, 1859): Thornton Pk - Mt Spec, NEQ; Miriam Vale, SEQ - SCNSW; 16° 11'S, 145° 20'E - 18° 57', 146° 11'; 24° 00', 151° 34' - SNSW; sea level - 1200m; subtropical vine forest, moist sclerophyll forest & heathlands; secure; well protected.

*Hoplocephalus stephensii* Krefft, 1869: Kroombit Tops, SEQ - Gosford, NSW; 24° 20'S, 151° 01'E - 32° 26', 151° 20'; 300 - 1000m; subtropical vine forests, heathlands; secure; moderately protected.

*Notechis scutatus* (Peters, 1861): Mt Moffat section, Carnarvon NP; Ocean L., Fraser Is - V; 24° 55'S, 148° 03' - 24° 58', 148° 08'; 24° 55', 153° 16' - V; sea level - 1000+m; subtropical vine forest, usually from open forests; secure; well protected.

*Pseudechis porphyriacus* (Shaw, 1794): Big Tblnd - Blue Water Ra., NEQ; Mt Dryander, Conway NP - Crediton, MEQ; Gladstone, SEQ - Victoria; 15° 42'S, 145° 17'E - 19° 14', 146° 24'; 20° 16', 148° 35' - 21° 13', 148° 32'; 23° 51', 151° 16' - V; sea level - 1000+m; monsoon & subtropical vine forests; secure; well protected.

*Rhinoplocephalus nigrescens* (Günther, 1862): Big Tblnd - V; 15° 42'S, 145° 16'E - V; sea level - 1100+m; subtropical & monsoon vine forests and adjacent moist open vegetation; secure; well protected.

*Tropidechis carinatus* (Krefft, 1863): Thornton Pk - Mt Spec, NEQ; Fraser Is., SEQ - Barrington Tops, NSW; 16° 10'S, 145° 23'E - 18° 57', 146° 11'; 24° 48', 153° 13' - 32° 02', 151° 24'; sea level - 1374m; subtropical & monsoon vine forests, heaths and moist open forests; secure; well protected.

#### Boidae

*Morelia amethystina* (Schneider, 1801): Cape York P., FNEQ - Townsville, NEQ; 11° 48'S, 142° 21'E - 19° 20', 146° 30'; sea level - 1100m; monsoon vine forests and open forests, extralimital in NG and adjoining islands; secure; well protected.

*Morelia spilota* (Lacépède, 1804): throughout Q; sea level - 1100m; dry vine thickets, monsoon & subtropical vine forest & open forests; secure; well protected.

*Morelia viridis* (Schlegel, 1872): Claudie R. - Rocky R., FNEQ; extralimital in PNG; 12° 46'S, 143° 17'E - 13° 49', 143° 28'; sea level - 400m; monsoon vine forest; rare; poorly protected.

#### Typhlopidae

*Ramphotyphlops nigrescens* (Gray, 1845): Kroombit Tops, SEQ - Victoria; 24° 24'S, 150° 59'E - V; sea level - 800m; subtropical vine & moist open forests; secure; moderately protected.

*Ramphotyphlops polygrammicus* (Schlegel, 1839): islands of Torres Strait; Cockatoo Ck, Heathlands, FNEQ - Eungella NP, MEQ; 10° 23'S, 142° 02'E; 11° 39', 142° 37' - 21° 10', 148° 30'; sea level - 900m; monsoon vine forest; secure; moderately protected.

*Ramphotyphlops silvia* Ingram & Covacevich, 1993: Fraser Is. NP - Rainbow Beach area, SEQ; 24° 52'S, 153° 16'E - 26° 10', 152° 55'; sea level - 100m; subtropical vine forest; rare; well protected.

### CONSERVATION

Most of Australia's rainforests are in Queensland and, in general terms, are now well-protected. They present one of the success stories in the history of the Australian conservation movement. The Rainforest Conservation Society Inc., formed in 1982, played the major role in heightening public awareness of rainforests, converting this to political will to increase protection

of rainforests and to provide finance to increase research to understand them better. Rainforests of the Wet Tropics, which have the highest frog-reptile species endemism known for any part of Australia, were placed on the World Heritage register in 1988; much of the moist rainforest of mideastern Queensland is now protected in National Parks; moist rainforests of most of southeastern Queensland have been nominated for inclusion on the World Heritage List (Govern-

ment of Australia, 1992); remnants of the dry rainforests of the southern part of Queensland, too, are now protected from further clearance by the Forest Service (Forster et al., 1991), although most are not declared national parks or other specially protected reserves, and there is thus no legislative protection for them. Not protected or not well-protected are major moist rainforests in the far north of the state (on Moa Is., at Somerset and in the Mellwraith Ra.); dry rainforests north of the Carnarvon Ra., MEQ; and small, isolated patches of dry rainforest on the western side of Cape York Peninsula.

Gazetted as National Park, the highest level of protection possible for a forest in Queensland, cannot guarantee protection. The Forty Mile Scrub near Mt Garnet, NEQ, has been National Park since 1970. This is a semievergreen vine thicket. Here, following disturbance of the ground by feral pigs, there has been an invasion by *Lantana camara*, which has created a rich understorey. This, in turn, has created a fire hazard in a forest which was previously highly fire resistant; and fire has destroyed substantial portions of this forest (R. Fensham, pers. comm.). Moist rainforest on Moa Is., although not safe in terms of special protective status by legislation, is in excellent condition and, at least for the foreseeable future, safe by default. Moa Islanders are sea-farers, and have thus made virtually no incursions into the rainforest on the high part of their island (J. Whittier, pers. comm.). Dry rainforest (= vine forest and vine thicket) on the western side of Cape York Peninsula, near Weipa, NWQ, has recently been surveyed (Cameron & Cogger, 1992). They note these habitats are small and fragmented and that their frog-reptile fauna is depauperate, a feature they share with other rainforests on the Cape. (Species paucity in northern Cape York Peninsula rainforests vs extraordinarily high species diversity in southern Peninsula rainforests has been discussed many times, most recently by Covacevich, in press. Those of the north have had '... a discontinuous history because of climatic fluctuations during the Quaternary.'..., Cameron & Cogger, 1992).

Protection of habitat is fundamental to protecting frog and reptile (and other) species, but it does not guarantee their survival. The alarming case of unexplained declines in populations of numerous species of rainforest frogs attests to this. First signs of declines in rainforest frog populations were reported in the late 1970s. (Winter & McDonald, 1986) who noted possible problems with

*Rheobatrachus vitellinus* and *Taudactylus eungellensis* at low altitudes in the Eungella NP, MEQ. McDonald (1990) undertook special surveys of *R. vitellinus*, *T. eungellensis* and *T. liemi* in the area. His work showed that *R. vitellinus* disappeared in March, 1985; that *T. eungellensis* had disappeared in June, 1986; and that *T. liemi* appeared safe. *T. eungellensis* has been found once since then (Couper, 1992) giving a glimmer of hope for this species. In southeastern Queensland the congeners of these highly specialised frogs have not been seen, despite intensive searching, since 1979 (Czechura & Ingram, 1990).

The depressing state of affairs with populations of several tropical rainforest frog species in various degrees of decline has been reviewed recently (Richards et al., 1993). Two species (*Litoria nyakalensis* and *T. rheophilus*) were not seen in 1991-2 surveys; the former being seen last in November, 1990, the latter in January, 1990. For other species (*L. nannotis*, *L. rheocola*, *L. lorica*, *Nyctimystes dayi*, *T. acutirostris*) grave fears are held. Populations of some of these in some well-documented sites have disappeared; others are clearly in decline across their whole range.

Although natural population fluctuations are well known for frog species (e.g. Peachmann et al., 1991), these can be difficult to distinguish from true declines. Richards et al. (1993) conclude that the declines they report are 'real'; those reported by Czechura and Ingram (1990) certainly appear 'real', if a 14-year absence has any meaning. Several explanations have been advanced to explain declines in frog populations elsewhere. These are summarized and excluded as relevant to the problem in the Wet Tropics frogs by Richards et al. (1993). Factors which do not appear to be relevant to these declines in the Wet Tropics and southeastern Queensland are: destruction of habitat; historic uses of sites for timber-gathering or mining; other direct human factors (collecting, road mortality); acid-rain; heavy metal, pesticide or other water pollution; drought-induced lowering of the water table; and flooding. Damage to stream habitats by feral pigs had increased at one study site and could be neither discounted nor verified as a causal factor. Similarly, the role of climatic change could not be fully assessed and was neither blamed nor discounted.

By any standard the habitats of all these frog species are extremely well-protected and have been for considerable time. Declines in other taxa



in these habitats have not been observed, but that does not, of course, mean they have not taken place. Nor have they been reported in frog species from habitats other than rainforest, with one exception. (The exception is *Litoria aurea*, a southern species from open forests, generally at low altitudes, G. Ingram, pers. comm.). There is at present no clear reason to account for the declines or disappearances documented and, obviously, no clear course to follow to attempt to save the frogs. The words of Czechura and Ingram (1990) are as accurate and worrying now as they were when written '... it is very difficult to decide whether or not the missing frogs are extinct. Extinction is not easy to prove. If the missing frogs are extinct, their passing was not a slow process. Rather it appears to have been a catastrophic event that could not have been anticipated or prevented.'

The fauna authority in Queensland (Department of Environment & Heritage), Australian Nature Conservation Agency, James Cook University, the Wet Tropics Management Agency, the University of Queensland and the University of Newcastle are supporting the following projects under an umbrella study of declining frogs of Queensland and New South Wales (McDonald): survey of the distribution and status of *Litoria longirostris* (McDonald); monitoring declining frog populations of the Wet Tropics Biogeographic Region (McDonald); genetic study of several threatened frog species of the Wet Tropics (Moritz & Cunningham); intensive survey of tadpole populations of streams in different catchments of the Wet Tropics (Trenerry); study of mortality rates of semi-captive populations of *T. acutirostris* and *T. rheophilus* (Mahoney & Dennis); captive breeding of two species of threatened stream-dwelling frogs in the Wet Tropics (Richards & Alford); preliminary survey of diseases of Wet Tropics frogs (Spear); community ecology of Eungella stream-dwelling frogs (Hero, McDonald, Alford); survey of distribution and abundance of rare or threatened stream-dwelling frogs, SEQ (McDonald & Ingram); survey to assess the status of *T. pleione* (McDonald & Hero).

In addition, the Wet Tropics Management Agency will fund a 3-year study of the ecology and conservation of declining frogs (Wet Tropics Management Agency, in litt.) and the Endangered Species Program will fund a survey of declining frogs in New South Wales. From these studies it is hoped that it will be possible to devise remedial strategies.

Since January, 1984, 8 new species of frogs and 24 new species of reptiles have been described from Queensland's rainforests. Increased public interest in rainforests has spearheaded a dramatic increase in research on rainforest fauna in recent years. This has led to a rate of discovery and description of new taxa that equals or surpasses the previous great eras of discovery of frog and reptile species between 1960-80, and pre-1900. For many rainforest taxa, especially invertebrates, only a small proportion of the species are described. For the frogs and reptiles, however, the stage has been reached where the species and their broad limits of occurrence are fairly well-known. There are notable exceptions to this suggestion. Cryptic species are known within *Mixophyes schevilli* (M. Mahoney, pers. comm.) and *Gnyptoscincus queenslandiae* (C. Moritz, pers. comm.) as they are presently defined; remote, as yet unexplored, specialized habitats may yet yield new species; and, amongst the burrowing forms, there are probably undescribed taxa.

Notwithstanding the facts that much is now known about rainforest frog and reptile species and that many are now secure and moderately to well protected (Table 2), much remains to be learnt. Several species remain endangered or vulnerable, and either poorly protected or unprotected (Table 2).

Several species from the McIlwraith Ra., FNEQ urgently need protection in reserves (e.g. *L. eucnemis*, *L. longirostris*, *C. crepitans*, *C. peninsularis* and *S. occultus*, all of which are either rare or insufficiently known and poorly or not protected). Precise details of their distribution are lacking, as are any data on breeding or other habits for most species. Further, there are some rainforests in which no herpetological work has been undertaken. One example is Nangur SF, only 250km NW of Brisbane. In late 1992, this semievergreen vine thicket was investigated herpetologically for the first time. *N. spinosa*, a distinct member of the *Sphenomorphus* group has since been described from there (Covacevich et al., 1993). No survey work has been undertaken in the Moa Is. moist rainforest and in many other semievergreen vine thickets of both southern and northern Queensland.

In Queensland much of the research money spent in recent years on vertebrates has been used on either rare and threatened species or on those from rainforests. From this, valuable data have been published, and there are now reliable data for some species. Reasonable decisions regarding

Table 2. Conservation status and levels of protection of Queensland's rainforest frog and reptile species.

LEVEL OF PROTECTION	CONSERVATION STATUS					TOTAL
	E	V	R	S	IK	
Well	5(0)	4(1)	7(10)	16(43)	1(2)	33(56)
Moderately	0(0)	0(0)	3(5)	1(17)	0(0)	4(21)
Poor	2(0)	0(0)	0(3)	1(5)	3(2)	6(11)
Unprotected	0(0)	0(1)	2(5)	0(0)	1(2)	3(8)

E (endangered); V (vulnerable); R (rare); S (secure); IK (insufficiently known); unbracketed = frogs; bracketed = reptiles.

plans for future conservation of rainforest frogs and reptiles can now be made.

With finite resources it is important to remember that rainforest is not the only important habitat in Queensland and that rainforest frogs and reptiles are, generally, reasonably well-researched taxonomically and well-protected. Few ecological data are available, however, for most species, and lack of data is a major problem. Efforts must continue towards solving the disappearing frogs' problem and others that may occur, and building a store of knowledge about the ecology of rainforest species. There is now, however, a reasonable ease to be made for some shift of emphasis to other species in other habitats more vulnerable and less well-known (e.g. deserts, black soil plains, heaths and grasslands).

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